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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/975,540      | 10/10/2001  | Chih-Yung Chang      | 67,200-526          | 9423             |
| 7590            | 12/18/2003  |                      | EXAMINER            |                  |
|                 |             |                      | MARKOFF, ALEXANDER  |                  |
|                 |             |                      | ART UNIT            | PAPER NUMBER     |
|                 |             |                      | 1746                |                  |

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 09/975,540             | CHANG ET AL.        |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Alexander Markoff      | 1746                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10 October 2001.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 10 October 2001 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \*    c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
  - a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

|  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____                                     |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the heat exchange surface in fluid communication with the heat exchanger, the fluid communication flow path between the heat exchanger and the heat exchange surface, the heat exchanger provided with means for sensing the flow rate and means for sensing a temperature, means for sensing flow in the flow path and means for sensing temperature in flow path must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: the heat exchange surface (305). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: (303). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the

Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "308" has been used to designate both the wafer and the switch. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

#### ***Election/Restrictions***

5. It is noted that the instant claims directed to patentably distinct inventions, which could be properly restricted. No restriction requirement is made this time because the same prior art is applied to reject claims to both inventions. The applicants are however advised that if the claims would be amended to require separate consideration and/or search and to put a serious burden on the examiner, such requirement can be issued.

#### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 5-11 and 14-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claims 5-7 are indefinite because the term "the ambient pressure lacks proper antecedent basis.

Claims 8-11 are indefinite because it is not clear how the fluid is supplied to the surface when the wafer is mounted on this surface.

Claims 9-11 are further indefinite because it is not clear what meant by "fluid is supplied in fluid communication with a heat exchanger".

Claim 11 is further indefinite because it is not clear what is meant by "is controllably selected by a computer".

Claims 14-20 are indefinite because it is not clear how can the heat exchanger be in fluid communication with the surface, which serves for mounting the wafer.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Jeng et al (US Patent No 5,282,925).

Jeng et al teach an apparatus as claimed. See entire reference, especially Figures 3a, 4, 7 and 8 and the related description, especially columns 13-16.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 1-4 and 8-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the state of the prior art admitted by the applicants in the specification in view of Kim et al (any one of US 6,073,636; 5,972,161 and GB 2,13,574) and Jeng et al.

The applicants have admitted in the specification that a conventional etching using HBr chemistry or HBr with addition of chloro- and fluoro-hydrocarbons conventionally performed in a cluster tool by a plasma process. Such conventional process has a problem of remaining reactive chemicals. The applicants also described construction and operation of a conventional apparatus for the conventional process. See Fig. 1 and pages 1-5.

Kim et al teach that such problem as remaining etchant, such as HBr was recognized by the prior art and teach heating the substrate in a heating chamber to remove the etchant from the substrate.

It would have been obvious to an ordinary artisan at the time the invention was made to provide heating of Kim et al in the method and the apparatus of the prior art in order to solve a known problem according to the teaching of Kim et al.

Neither the admitted prior art, nor Kim et al teach the specific steps nor means for supporting the wafer in the heating chamber and specifics of heat exchange surface and temperature regulating means.

It is not clear from the brief disclosure of Kim et al as the substrate is supported in the heating chamber and whether or not the surface supporting the substrate is presented.

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However, Jeng et al teach that the claimed steps and means for supporting the substrates and heating the substrates were conventional in the apparatuses and methods for removing etching residues. See the above discussion regarding Jeng et al.

It would have been obvious to an ordinary artisan at the time the invention was made to incorporate heating arrangement of Jeng et al and the steps of it' operating in the method and apparatus of the admitted prior art modified by the teaching of Kim et al because Jeng et al teaches this for the purpose of removing etching residue.

14. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the state of the prior art admitted by the applicants in the specification in view of Kim et al (any one of US 6,073,636; 5,972,161 and GB 2,13,574) and Jeng et al as applied to claim 1 above, and further in view of Davis et al (any one of US Patents 6,323,463 and 6,410,889).

The modified method of the prior art does not specifically teach the claimed temperature, pressure and time for the removal of HBr –chlorine-fluorine based residue.

Temperature, pressure and process time are result effective variables. It would have been obvious to an ordinary artisan at the time the invention was made to find the optimum ranges for these parameters by routine experimentation.

Further, Jeng et al teach removing HF etching residue at temperature up to near 100°C. See at least column 14.

Davis et al teach that HBr is desorbed at temperatures 50-55°C and higher. See at leas column 4, lines 19-24 of 6,323,463.

Thereby, it would have been obvious to an ordinary artisan at the time the invention was made to conduct the modified method of the admitted prior art at temperatures near 100°C recommended by the prior art to ensure that the most of the components of residue (HBr, HF) are removed.

Davis et al also teach that the claimed pressures were conventional in the operation of the chambers disclosed by Kim et al. See at least column 5, lines 38-41.

It would have been obvious to an ordinary artisan at the time the invention was made to conduct the process at conventional pressures for the chamber with reasonable expectation of adequate results.

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patents 5,235,995; 5,770,263 and 6,358,859 are cited to show the state of the prior art with respect to methods and apparatuses for removing etching residues.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Markoff whose telephone number is 703-308-7545. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P Gulakowski can be reached on 703-308-4333.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703--308-0651.



Alexander Markoff  
Primary Examiner  
Art Unit 1746

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ALEXANDER MARKOFF  
PRIMARY EXAMINER